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# Effect of amylose, particle size & morphology on the functionality of starches of traditional rice cultivars

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## **Highlights**

- Rice cultivars displayed lower granule damage and higher starch crystallinity
- Rice cultivar having lowest particle size indicated lowest degree of crystallinity
- Starches with tightly packed granules had greater mean granular width
- Starch of all experimental rice cultivars displayed a typical A-type XRD patterns
- Starches with low amylose content had low crystallinity, peak height index (PHI)

## **Abstract**

The research was carried out to investigate the effect of starch powder particle size, morphology, amylose content and varietal effect on physicochemical, X-ray diffraction pattern, thermal and pasting characteristics. The results indicated that starches isolated from seven traditional rice cultivars of temperate region of India have possessed higher yield (82.47 to 86.83%) with lower degree of granule damage and higher level of starch crystallinity (36.55 to 39.15%). The water and oil binding capacities were observed to correlate positively with amylose content. The bulk density and color parameters of starches were found to have linked with starch powder particle size coupled with arrangement and morphology of the starch granules. The rice cultivars having smaller starch powder particle size indicated lowest degree of crystallinity. Morphological studies revealed that the starches with tightly packed granules had greater mean granular width, while granules with openly spaced granular morphology depicted the higher values for mean granular length. The peak height index (PHI) among different starches ranged from 1.01 to 2.57 whereas the gelatinization range varied from 10.66 to 10.88. Concluding, the differences in distributional pattern of starch granule size and shape and powder particle size indicated a significant effect on the functional properties of starch.

**Key words:** Rice starch; amylose content; physicochemical characteristics`

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